

treatise on the oyster, and an account of experiments on oyster culture, which we have not space to discuss in the present number.

OUR BOOK SHELF

Wanderings South and East. By Walter Coote. Maps and Illustrations. (London: Sampson Low and Co., 1882.)

Pioneering in the Far East, and Journeyings to California in 1849, and the White Sea in 1878. By Ludwig Verner Helms. Illustrations. (London: Allen and Co., 1882.)

ALTHOUGH these two volumes cover a very wide field, neither of them can be said to break on new ground. Mr. Coote does not profess to be much more than a tourist, but as he tells the story of his wanderings pleasantly, and touched at a few places concerning which our information is scanty, he may be held to have sufficient excuse for bringing the record of his journey before the public. He spent some time in the Australian Colonies and Fiji, and visited Norfolk Island. His wanderings further embraced the Hawaiian Islands, the New Hebrides, the Banks and Torres Islands, the Santa Cruz and Solomon Islands, New Caledonia and the Loyalty Group. China and Japan, and Central and South America were also embraced in his extensive tour. Mr. Coote is a good observer, and the information he gives concerning what he saw in the less frequented islands, the New Hebrides, the Santa Cruz, Solomon and Loyalty Islands, is a welcome addition to existing knowledge. He is chiefly interested in the people, habits, houses, implements, and weapons, and therefore the ethnologist may find something in his volume that will be of service. The illustrations are good, and the volume as a whole is extremely pleasant reading.

Mr. Helms is an old traveller, and most of his volume takes us back about thirty years ago. He spent considerable time in Bali and Borneo, where he took a prominent part in the events connected with Rajah Brooke; visited Cambodia and Siam, China and Japan, and spent some little time in California during the height of the gold fever. He brings together much curious and interesting information about Bali and Borneo, especially at the time of his sojourn, the condition of the people, their manners and customs, the state of trade, &c. He gives a very vivid description of an instance of suttee which he witnessed. His account of what he saw in California is interesting, and he finishes off with the record of a visit to the White Sea, in connection with some mining operations. Altogether his book is quite worth reading.

Hölzel's Geographische Charakter-Bilder für Schule und Haus. Herausgegeben unter Pädagogischer und Wissenschaftlicher Leitung, Von Dr. Josef Chavanne, K. v. Haardt, V. Prausek, Prof. V. Marilaun, Dr. Fried. Simony, Dr. Fr. Toula, Dr. K. Zehden, &c. (Vienna: Edward Hölzel, 1882.)

WE have already referred, in connection with Hirt's Geographische Bildertafeln, to the comprehensive idea of geography entertained in Germany, and the admirable methods adapted for infusing into the teaching of the subject as much of reality as possible. For enabling the pupil to realise the features about which he reads in his text-books, we have never seen anything to equal the Charakter-Bilder which are being issued by Hölzel of Vienna, and edited by a large staff of some of the best teachers. These pictures are on a very large scale, are coloured by the oleographic process, and have all the appearance of good oil-paintings. Each picture is devoted to one subject, and measures something like $2\frac{1}{2}$ feet by 2 feet. The aim is evidently to illustrate the leading features of the earth's surface, and bring before the pupil the main characteristics of the different countries.

Nine of these pictures have already been published; their subjects are the Ortler Region, the Shoshone Cañons and Waterfalls of North America, the Gulf of Pozzuoli, the Sahara Desert, the Bernese Oberland (a double picture), the Rotomahana Region of New Zealand, the Sierra Nevada, the Eastern Border of the Anahuac Plateau. Thus, it will be seen, the subjects are very varied. To each picture there is a separate explanatory text, entering with somewhat minute detail into the characteristics of the region illustrated, its topographical features, geology, biology, &c.; the text being accompanied with wood engravings still further to help in the understanding of the subject. We need scarcely point out what an important help these pictures and their text must be in the study of geography, nor how admirably calculated they are to lead children to interest themselves in the subject. To the household library they would be an important addition, and even those who have long left school might turn them over with pleasure and profit. We should like to see them brought within the reach of English schools.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Researches on the Division of the Chlorophyll-Granules and upon the Occurrence of Hypochlorin in the Cyanophyceæ and Bacillariaceæ

I, IN the year 1881, made a considerable series of examinations of the division of the chlorophyll-granules of phanerogamous and cryptogamous plants, and upon the occurrence of Pringsheim's hypochlorin in the lower algæ, especially in the order Bacillariaceæ and Cyanophyceæ (Phycchromaceæ). The investigations are in detail described in my paper, "A chlorophyll és a növényi sejtmag morfológiájához. Irta Schaarschmidt Gyula. Rajzokkal egy fotogrammon. Kolozsvárt, K. Papp Miklós örökösénél, 1881. 56 pp. 16°" (Contributions to the Morphology of the Chlorophyll and Vegetable Nucleus. With photograms. Kolozsvár, 1881, &c.), which is published in the Hungarian language. I take the liberty of briefly communicating the chief results, by way of insuring my priority.

I. The division of the chlorophyll-granules was discovered by Carl Nägeli in the year 1844. After him Milde, Wigand, Hofmeister, Rosanoff, Sachs, Kny, Strasburger, Velten, Haberlandt, Mikosch found that the chlorophyll-granules multiply by division in the lower and the higher plants. According to these authors, the granules are divided by a constriction in the middle; the green colouring-matter retires to the poles; consequently the protoplasmic isthmus between the daughter-granules is colourless. The new daughter-granules increase in size, until they become as large as their parent-granules. When detached, each divides again, and the process is repeated. But the process is, according to my observations not so simple. We find here an example of division that is very similar to the multiplication of the nucleus described and drawn by Hanstein, Strasburger, &c. The green colouring-matter retires before the division to the two poles of the oval-shaped granules, and in the middle a colourless band is thereby formed. In this state will be seen with powerful lenses (2000-3000 lin. magn.), and by careful preparation with alc. abs. and tincture of anilin, that in the protoplasmic isthmus small threads (filaments) are formed. The extremity of the threads is immediately fixed in the protoplasmic matter of the granules. If we examine the double granules, which are now lying detached at a little distance (united solidly by the threads), we see the threads between the daughter-granules expanded. This figure reminds us of the state of nucleus division called "cell-tun" (*Zell-Tonne*) by Strasburger. The new daughter-granules separate further and further; the threads are more and more extended, until the intervening space equals that occupied by two to three granules. During this time the inner portions, as they extend, develop more and more of the circle, until each becomes a perfect hemisphere. The

daughter-granules are separated by the growth itself and by accident, and the division is determined by the dilaceration of the threads. The young granules increase in size, and acquire their normal figure. After the division, there may be found upon the granules a few protoplasmatic hyalin cilia, divided in groups. These cilia are the remainder of the divisional threads. All these cilia spring from points where dark spots are seen upon the surface of the living granules. The compressed granules of Hartwegia, of Fern-Prothallia, of Vallisneria, and Elodea offer most favourable opportunities for ascertaining the manner of division. This singular process is repeated again and again, so that the older granules are compressed, and a filament is formed, which elongates more and more rapidly as the granules increase in number. Sometimes the filament may be ramified. This continued multiplication by division has its limits; the protoplasmatic bearer (the matter of the granule, which carries the colouring substance) changes its appearance, and contains starch-granules, which soon become numerous. The whole process cannot, of course, be seen in the same granule, but in some, dividing granules may be observed in one stage, and in others in another. In such a manner (though the process is not so clear) divides the endochrome of the Bacillariaceæ, as I have studied it, in *Himantidium pectinale*. That is the manner of division certainly most common. The second mode of multiplication by division is more simple. The granules are divided by a constriction, and separate into single granules; the daughter-granules become detached after they have reached their full form and size. No cilia or threads, only a small number two to three (not six to eight) are formed by the division in the isthmus between the half-granules. This division is a reduced form of the former, that is, the direct division without cilia; the former is the indirect division with cilia. The direct division I have studied in all higher and lower green plants in all seasons of the year. The second form, the direct division, is seen especially in the cells of *Vaucheria* and *Chara*. These changes in the division of chlorophyll-granules of which we speak, can only be observed with a considerable magnifying power (2000-3000 lin. mag.), that is the cause why Mikosch agrees with the other authors mentioned in disclaiming the notion of threads of the true mode of division. I ascertained these changes in March of the year 1880, and described them in a short notice in the *Magyar Növénytaní Lapok* (Hungarian Journal of Botany, edited by Prof. Dr. Kanitz Kolosvár (vol. iv. pp. 32-43).

II. Prof. Pringsheim,¹ after ascertaining the occurrence of hypochlorin in all higher chlorophyllous plants, and in many green algae, speaks in his paper, with reference to the Bacillariaceæ, "Sie fehlt (the hypochlorin) dagegen bei den nicht chlorophyll grünen Gewächsen; also bei den Phycoschromaceen, Diatomeen, Phaesporen. . . . Wenigstens konnte ich sie bisher in den genannten Pflanzengruppen noch nicht sicher nachweisen und nur Spuren derselben ist es mir geglückt, in manchen Entwicklungstadien einiger *Diatomeen* aufzufinden." I have, with the use of diluted muriatic acid, proved the occurrence of hypochlorin in all the Bacillariaceæ and Cyanophyceæ (Phycoschromaceæ) investigated. The experiment succeeded best with *Calothrix scopulorum*. The hypochlorin was seen in all these plants in the typical form of brown scales or brown drops.

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Kolosvár (Hungary), August 3

Mimicry in the "Plume Moths"

I HAVE not seen in any entomological work an attempt to explain the well-known peculiar character of the wings of the "Plume Moths" (*Pterophori*). They depart so thoroughly from the rest of the Lepidoptera in having the wings cleft into so-called feathery "plumes" (although retaining the microscopic scales characteristic of their order), that we may be certain so marked a type must have been evolved along definite lines and for specific reasons. One species (*Agdistes Bennetii*) may be regarded as the first stage in the differentiation of these insects; and from this species we have successive modifications in the number of "plumes" up to *Alucita polydactyla*, where the ordinary wings are split up into no fewer than twenty-four.

I have long thought this wing-peculiarity is due to *mimicry*, the objects mimicked being the down or *pappi* of thistles and other composite plants. The commonest of the "Plume

Moths," perhaps, is the "Large White Plume" (*Pterophorus pentadactylus*), and all entomologists are acquainted with its peculiar *drifting* mode of flight, exactly resembling that in which a thistle plume is blown by the wind. The other day I followed what I took to be a drifting thistle-plume, for the sake of seeing what species it belonged to, and found it to be a specimen of this species of moth, so remarkably similar do the two objects appear when in motion. If the intention of the "plume-moths" is to mimic the *pappi* of winged-seeds, we can understand why these insects do not fold the wings to the body when at rest, but seem to display them to the utmost instead.

The fact that (according to Stainton), out of about twenty species of *Pterophori*, the larvæ of which have their food plant given, no fewer than ten feed on composite plants, or plants bearing plumed seeds, indicate that the resemblance of the winged insects to pappi must also be protective to females when depositing their eggs on plants which produce down, as well as when they are flying. It would be interesting to compare the different kinds of thistle and other down with the appearance of the various species of "plume-moths" which thus appear to mimic them.

J. E. TAYLOR

Ipswich Museum, September 5

NOTE ON SOROCHÉ (MOUNTAIN SICKNESS) IN THE ANDES

THE effects of diminished atmospheric pressure on the human economy seem to vary so much with different individuals that a few facts of personal experience may be of some interest to those who have attended to the subject. During a somewhat prolonged acquaintance with mountain travelling, I had never felt any of the symptoms described as characteristic of mountain sickness. The only effect of rarified air that I had been able to verify was that an equal amount of mechanical effort produced at a great height necessitates a greater effort, so that climbing or other muscular effort causes, *ceteris paribus*, more sense of fatigue. Being in Peru in the month of April last, I was about to avail myself, with a friend, of the opportunity afforded by the reopening for traffic of the Oroya railway, and to spend a few days at Chicla, the present terminus of that remarkable work. The height of Chicla above the sea is 12,200 feet, and we were assured by several residents in Lima that we should infallibly suffer from the *soroche*, the local name for mountain sickness in Spanish America. Not having ever experienced the slightest inconvenience at heights considerably exceeding that limit in the Alps, I treated these warnings with some derision, and in truth they had passed from my mind on the evening when I arrived at Chicla. I may say at once that neither there nor anywhere else have I experienced any of the symptoms of mountain sickness by day, or while up and moving about after dark. On the evening of our arrival, after a frugal supper we retired to bed about eleven o'clock. Soon after falling asleep, I awoke with a severe headache, which continued throughout the night, allowing only a few short and broken snatches of sleep, but which passed away soon after I rose somewhat before sunrise. On comparing notes with my friend, I found that he also had suffered from headache during the night; but as he is somewhat subject to that affection, he had not attributed it to any special cause, whereas with me it is most unusual.

The following day was spent in botanising on the steep slopes upon either side of the valley at Chicla, and as I was quite free from any inconvenient sensation, I attributed the headache of the previous night to some accidental cause rather than to diminished pressure. On the second night, going to bed about the same hour, I again awoke with a headache more severe than that of the previous night, and was altogether unable to sleep for the rest of that night. Some two or three hours after midnight I was suddenly seized with retching of the stomach, but, perhaps because my light dinner was fully digested, no further effect followed.

We had arranged for the succeeding day to ride to the

¹ Ueber Lichtwirkung und chlorophyllfunction in der Pflanze Jahrb. f. wiss. Bot. xii., 1881. Heft iii. p. 296.